RECORD COPY

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No. PCT/FI 9 8 / 0 0 9 4 6

International Filing Date 0 4 DEC 1998 (0 4. 12. 98)

The Finnish Patent Office
PCT International Application

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) T297070PC/nu

Box No. I TITLE OF INVENTION

Transmission method and radio system

Box No. II APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

NOKIA TELECOMMUNICATIONS OY
Keilalahdentie 4
FIN-02150 Espoo
Finland

☐ This person is also inventor

Telephone No.

Facsimile No.

Teleprinter No.

State *(that is, country)* of nationality: FI

State *(that is, country)* of residence: FI

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

PIIRAINEN Olli
Pikisaarentie 1 E 11
FIN-90100 Oulu
Finland

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: FI

State *(that is, country)* of residence: FI

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

PATENTTITOIMISTO TEKNOPOLIS KOLSTER OY
C/O KOLSTER OY AB
Iso Roobertinkatu 23
P.O. Box 148
FIN-00121 Helsinki
Finland

Telephone No.
358-9-618821

Facsimile No.
358-9-602244

Teleprinter No.

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked):*

Regional Patent

- ☒ **AP** **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA** **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA** **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)*

.....

National patent *(if other kind of protection or treatment desired, specify on dotted line):*

- ☒ **AL** Albania .....
- ☒ **AM** Armenia .....
- ☒ **AT** Austria and utility model .....
- ☒ **AU** Australia .....
- ☒ **AZ** Azerbaijan
- ☒ **BA** Bosnia and Herzegovina .....
- ☒ **BB** Barbados
- ☒ **BG** Bulgaria .....
- ☒ **BR** Brazil .....
- ☒ **BY** Belarus
- ☒ **CA** Canada
- ☒ **CH and LI** Switzerland and Liechtenstein
- ☒ **CN** China .....
- ☒ **CU** Cuba .....
- ☒ **CZ** Czech Republic and utility model .....
- ☒ **DE** Germany and utility model .....
- ☒ **DK** Denmark and utility model .....
- ☒ **EE** Estonia and utility model .....
- ☒ **ES** Spain .....
- ☒ **FI** Finland and utility model .....
- ☒ **GB** United Kingdom
- ☒ **GE** Georgia .....
- ☒ **GH** Ghana .....
- ☒ **GM** Gambia
- ☒ **HR** Croatia
- ☒ **HU** Hungary .....
- ☒ **ID** Indonesia
- ☒ **IL** Israel .....
- ☒ **IS** Iceland
- ☒ **JP** Japan .....
- ☒ **KE** Kenya .....
- ☒ **KG** Kyrgyzstan .....
- ☒ **KP** Democratic People's Republic of Korea .....

.....

- ☒ **KR** Republic of Korea .....
- ☒ **KZ** Kazakstan .....
- ☒ **LC** Saint Lucia
- ☒ **LK** Sri Lanka
- ☒ **LR** Liberia
- ☒ **LS** Lesotho .....
- ☒ **LT** Lithuania
- ☒ **LU** Luxembourg .....
- ☒ **LV** Latvia
- ☒ **MD** Republic of Moldova .....
- ☒ **MG** Madagascar .....
- ☒ **MK** The former Yugoslav Republic of Macedonia

- ☒ **MN** Mongolia
- ☒ **MW** Malawi .....
- ☒ **MX** Mexico .....
- ☒ **NO** Norway
- ☒ **NZ** New Zealand .....
- ☒ **PL** Poland .....
- ☒ **PT** Portugal .....
- ☒ **RO** Romania
- ☒ **RU** Russian Federation .....
- ☒ **SD** Sudan
- ☒ **SE** Sweden
- ☒ **SG** Singapore
- ☒ **SI** Slovenia .....
- ☒ **SK** Slovakia and utility model .....
- ☒ **SL** Sierra Leone
- ☒ **TJ** Tajikistan .....
- ☒ **TM** Turkmenistan .....
- ☒ **TR** Turkey .....
- ☒ **TT** Trinidad and Tobago .....
- ☒ **UA** Ukraine .....
- ☒ **UG** Uganda .....
- ☒ **US** United States of America .....

- ☒ **UZ** Uzbekistan .....
- ☒ **VN** Viet Nam .....
- ☒ **YU** Yugoslavia .....
- ☒ **ZW** Zimbabwe .....

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet

- ☒ **GD** Grenada .....
- ☐ .....

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM ☐ Further priority claims are indicated in the Supplemental Box

	Filing Date of earlier application (day/month/year)	Number of earlier application	Where earlier application is: national application: country	regional application:* regional Office	international application receiving Office
item (1)	05 December 1997 (05.12.1997)	974446	FI		
item (2)					
item (3)					

☒ The receiving Office is hereby requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s) : (1)

* *Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(If two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):* ISA /SE

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date *(day/month/year):* Number Country *(or regional Office)*

Box No. VIII CHECK LIST

This international application contains the following **number of sheets:**

request	:	3
description (excluding sequence listing part)	:	9
claims	:	4
abstract	:	1
drawings	:	2
sequence listing part of description	:	0
Total number of sheets	:	**19**

This international application is **accompanied** by the item(s) marked below

1. ☒ fee calculation sheet
2. ☒ separate signed power of attorney
3. ☒ copy of general power of attorney
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language)
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☒ other (specify): official action

Figure of the drawings which should accompany the abstract: 4

Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

PATENTTITOIMISTO TEKNOPOLIS KOLSTER OY

Leo Lehtonen

For receiving Office use only

1. Date of actual receipt of the purported international application:	04 DEC 1998 (04 -12- 1998)	2. Drawings:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		☐ received
4. Date of timely receipt of the required corrections under PCT Article 11(2):		☐ not received:
5. International Searching Authority specified by the applicant: ISA/ SE	6. ☐ Transmittal of search copy delayed until search fee is paid	

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

PATENT COOPERATION TREATY

NP

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
BERESFORD & Co.
Attn. BERESFORD, K.D.L.
2-5 Warwick Court
High Holborn
LONDON WC1R 5DJ
UNITED KINGDOM

RECEIVED
24 AUG 1998
BERESFORD & Co

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference 5246699	Date of mailing *(day/month/year)* 20/08/1998
International application No. PCT/GB 98/ 01240	FOR FURTHER ACTION See paragraphs 1 and 4 below
Applicant LAWRIE, Roderick, Malcolm, Gordon	International filing date *(day/month/year)* 29/04/1998

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicants's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Trudy Thoen de Jong

ENTERED BY	Q
DUE	24/9/98
BRING-UP	1/9/98

Form PCT/ISA/220 (January 1994)

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
5246699		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/GB 98/01240	29/04/1998	30/04/1997
Applicant		
LAWRIE, Roderick, Malcolm, Gordon		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. [ ] **Certain claims were found unsearchable (see Box I).**

2. [ ] Unity of invention is lacking (see Box II).

3. [ ] **The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing**
   - [ ] **filed with the international application.**
   - [ ] **furnished by the applicant separately from the international application,**
     - [ ] **but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.**
   - [ ] **Transcribed by this Authority**

4. **With regard to the title,**
   - [X] **the text is approved as submitted by the applicant**
   - [ ] **the text has been established by this Authority to read as follows:**

5. **With regard to the abstract,**
   - [X] **the text is approved as submitted by the applicant**
   - [ ] **the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.**

6. **The figure of the drawings to be published with the abstract is:**

   Figure No. 1
   - [X] as suggested by the applicant.
   - [ ] because the applicant failed to suggest a figure.
   - [ ] because this figure better characterizes the invention.
   - [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 98/01240

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G06F17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 592 375 A (SALMON BARDWELL C ET AL) 7 January 1997 see column 1, line 25 - line 38 see column 2, line 15 - line 24 see column 14, line 2 - column 15, line 21	1,2,14, 15
A	US 5 592 378 A (CAMERON PAUL S ET AL) 7 January 1997 see abstract; claim 1 see column 13, line 41 - column 18, line 8; figures 17-26	1,2,14, 15
A	EP 0 706 124 A (SONY TRANS COM INC) 10 April 1996 see abstract; claim 1	1,2,14, 15

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 August 1998	20/08/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Suendermann, R

Form PCT/ISA/210 (second sheet) (July 1992)

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5592375 A	07-01-1997	AU 1996695 A WO 9524687 A	25-09-1995 14-09-1995
US 5592378 A	07-01-1997	NONE	
EP 0706124 A	10-04-1996	US 5675752 A JP 8194608 A	07-10-1997 30-07-1996

A TRANSMISSION METHOD AND RADIO SYSTEM ADJUSTING TRANSMISSION MOMENTS

FIELD OF INVENTION

The invention relates to a transmission method used in a radio system that comprises at least one base station and a number of subscriber terminals, at least two of which transmit access bursts to one and the same base station, the access burst activating between a subscriber terminal and a base station a connection that is established by a signal that is of a certain frequency and is sent in time slots.

BACKGROUND OF INVENTION

Indoors, for example in office buildings, base stations suited particularly for the place concerned are used. The base stations receive and transmit a signal by means of RF heads. The RF heads of the base stations are positioned about the building so that the coverage areas of the base stations cover the whole building insofar as possible. In practice the RF heads comprise, for example, transceiver antenna units.

When an indoors radio system is designed, particular attention must be paid to matters affecting the propagation of the signal. The walls and other structures in the building may attenuate the signal very rapidly. The rapid attenuation of the signal may require a very dense base station network, whereby the RF heads are also relatively close to one another. Because of the large number of base stations, the system is relatively expensive to build.

The RF heads are positioned in suitable places about the building, whereby a connection can be established between a subscriber terminal and a base station. Because of the large number of RF heads, it has been possible to reduce the distance between the subscriber terminal and the RF head, which also reduces the delay from the RF head to the subscriber terminal.

The number of RF heads is normally larger than the number of base station transmitters. In addition, the number of transmitters is usually larger than the number of radio frequencies used at the base station. Let us assume that the subscriber terminals are connected with different RF heads of one and the same base station by means of a signal transmitted by them. If the subscriber terminals establish a connection with the base station by means of signals of the same frequency, interference may occur between the RF heads. The occurrence of interference is even more likely if the signals are transmitted using the same frequencies in the same time slots. The RF heads

receive the interference signal substantially simultaneously with the information signal, whereby the information signal is difficult to separate from the interference signal.

Radio systems typically employ a known training sequence, which is added to a burst to be transmitted. The training sequence is used to estimate the impulse response of the received signal. If both subscriber terminals use the same training sequence, it is difficult for the receiver of the base station to separate the information signals from the interference signals. In practice this means that the receiver is not able to separate the interference signal from the impulse response of the information signal estimated by it, whereby the quality of the signal is impaired. The problem can be solved by using signals of different frequencies on the connections, but the number of frequencies that can be used is, however, limited. If only signals of different frequencies are transmitted in the radio system, the costs of building the radio system are high.

In so-called office base stations intended for indoors, relatively low signal transmission power is used, since the RF heads are located in the vicinity of people. A sufficiently reliable estimate, however, is not achieved with the previously known methods because of the low transmission power, and this impairs the performance of the receiver.

BRIEF DESCRIPTION OF INVENTION

The object of the invention is to provide a transmission method and a radio system in which the above problems are solved. The object is achieved with a method described in the introduction, the method being characterized in that when the subscriber terminal is commanded to send the base station a signal that employs a time slot and frequency already used by another subscriber terminal, the subscriber terminal is sent a command to adjust the transmission moment of the signal so that the base station receives the transmitted signals at different moments.

The invention also relates to a radio system that comprises at least one base station and a number of subscriber terminals, at least two of which transmit access bursts to one and the same base station, the access burst activating between a subscriber terminal and a base station a connection that is established by a signal that is of a certain frequency and is sent in time slots.

The radio system is characterized by comprising transmission means, which command the subscriber terminal to send the base station a signal that employs a time slot and frequency already used by another subscriber terminal, and adjustment means, which on the basis of the command sent by the transmission means adjust the transmission moment of the signal to be transmitted to the base station so that the base station receives the transmitted signals at different moments.

The preferred embodiments of the invention are claimed in the dependent claims.

The basic idea of the invention is that the signals to be transmitted are delayed, if necessary, whereby an interference signal and an information signal can be separated from each other.

Several advantages are achieved with the transmission method and radio system of the invention. Since the signals transmitted at the same frequency can be separated after the signals have been received, the radio system can be implemented using a minimal number of different radio frequencies. The signals by means of which the subscriber terminals communicate simultaneously with adjacent RF heads can use the same frequency. This reduces costs when the radio system is built: for example, the number of transmitters can be reduced. In addition, signals can be received even at very low signal reception levels.

BRIEF DESCRIPTION OF FIGURES

In the following the invention will be described in greater detail in connection with preferred embodiments and with reference to the attached drawings, in which

Fig. 1 is a general view of a radio system in which a method of the present invention is used,

Fig. 2 is a general view of a structure of a transceiver used in the radio system of the invention,

Fig. 3 shows a radio system of the invention,

Fig. 4 is a more detailed view of the radio system of the invention, and

Fig. 5 shows a normal burst of the GSM system.

DETAILED DESCRIPTION OF INVENTION

Fig. 1 is a general view of a radio system in which a method of the present invention is used. The radio system comprises base stations 100, a base station controller 300 and subscriber terminals 201-203. The base stations are connected to the base station controller 300, for example, via a transmission line. The subscriber terminals establish a connection to the base stations by means of signals transmitted by them. The base station 100 usually forwards the signal transmitted by the subscriber terminal, for example, to another subscriber terminal. In practice, the base station 100 and the subscriber terminal 201-203 operate as transceivers.

Fig. 2 is a general view of a structure of a transceiver used in the radio system of the invention. The base station and the subscriber terminal comprise, in principle, the structures shown in Fig. 2. The transceiver comprises an antenna 108, which operates as a transceiver antenna. In addition, the transceiver comprises radio frequency parts 112, 124, a modulator 123, a demodulator 113 and a control block 120.

The transceiver further comprises an encoder 122 and a decoder 114. The control block 120 controls the operation of the above transceiver blocks. The radio frequency parts 112 convert the radio frequency signal obtained from the antenna 108 to an intermediate frequency. The intermediate-frequency signal is supplied to the demodulator 112, which demodulates the signal. The demodulated signal is subsequently decoded in the decoder 114.

The encoder 112 receives a signal and transmits the coded signal to the modulator 123. The coding in the encoder 122 is implemented, for example, as convolution coding. The encoder 122 also, for example, encrypts the signal. Further, the encoder 122 interleaves the bits or bit sequences of the signal. The convolution-coded signal is then supplied to the modulator 123, which modulates the signal. The signal is then supplied to the radio frequency parts 124, which convert the modulated signal into a radio frequency signal. The radio frequency parts 124 transmit the signal by means of the antenna 108 onto the radio path.

Fig. 3 shows a radio system of the present invention. The radio system comprises a number of RF heads 161-167 and two subscriber terminals 201, 202. The radio system is particularly suitable for indoors, for example, for office buildings. In practice, the RF heads are positioned in the

rooms so that the signals transmitted via the RF heads cover the whole building insofar as possible. The radio system also comprises four transmitters 141-144, means 130, and connection means 150. In practice, the transmitters 141-144, means 130 and connection means 150 are located at the base station 100. In the radio system illustrated by the figure, the RF heads 161-167 are connected to the connection means 150 via a cable 170. The connection means 150 are further connected to means 130 via transmitters 141-144, means 130 providing an Abis interface between the base station 100 and the base station controller 300.

The base station 100 and the subscriber terminal 201, 202 are connected with each other by means of signals. In the radio system illustrated by the figure, subscriber terminal 201 is connected with RF head 166 by signal 211. Subscriber terminal 202 is connected with RF head 167 by signal 212. In the radio system of the figure, RF heads 166, 167 are adjacent RF heads, located relatively close to each other.

The subscriber terminal activates the establishment of the connection with the base station 100 by means of access bursts transmitted by it. The base station 100 receives the access bursts on a RACH channel (RACH = Random Access). After the reception of the access bursts, the base station controller 300 controlling the base station 100 of the radio system sends the base station 100 a signal activating the channel. A time division multiple access TDMA method is preferably used in the radio system, whereby the signals establishing the connection are transmitted in time slots. The number of simultaneous connections is increased in practice by transmitting signals at different frequencies.

Fig. 4 shows the radio system of the invention in greater detail. The radio system comprises transmission means 101 and correlation means 102. The transmission means 101 transmit commands to the subscriber terminal, and on the basis of the commands the subscriber terminal changes the frequency of the signal transmitted by it. The correlation means 102 form impulse responses from the signals received by the base station 100. In addition, the radio system comprises data storage means 103, which store information about the radio frequencies used in the radio system. In the radio system illustrated by the figure, means 101, 102, 103 communicate with the base station 100. In practice, means 101, 102, 103 are located at the base station 100.

The subscriber terminal 201 of the figure comprises adjustment means 205, which adjust the transmission moment of the signal transmitted by the subscriber terminal 201. The subscriber terminals transmit a training sequence in conjunction with the signals to the base station 100. On the basis of the training sequence received by the base station 100, the correlation means 102 connected with the base station separate from each other at least two signals that are of the same frequency and have been received from the same time slot.

With reference to Fig. 3, let us first assume that the number of radio frequencies used at the base station 100 is smaller than the number of the transmitters 141-144 contained in the base station 100. The figure shows that the subscriber terminals 201, 202 communicate with one and the same base station 100 via different RF heads. Let us further assume that the subscriber terminals use a similar training sequence, by which the impulse response of the received signal is estimated. If the subscriber terminals use the same frequency and time slot, interference may occur between the RF heads 166, 167. Let us assume that subscriber terminal 201 in the radio system produces an interference signal 311 that propagates to RF head 167. Let us further assume that subscriber terminal 202 produces an interference signal 312 that propagates to RF head 166.

The correlation means 102 select, on the basis of the correlation, the signal with the best quality or for example the highest energy, and the signal is then used as an actual connection-establishing signal. The signals generated on the basis of the correlation are also placed in so-called windows. The correlation means 102 compare the summed energies of the impulse responses of the signals placed in the windows, whereby the interference signals received by the RF heads can be detected. Also, the subscriber terminal producing the interference signal can be detected.

The subscriber terminal 201 can communicate with a plural number of RF heads simultaneously. On the basis of the correlation, the signals that have been received by the RF heads and have been transmitted by one and the same subscriber terminal can be detected. When the subscriber terminal 201 roams in the radio system, the base station 100 instructs the subscriber terminal 201, if necessary, to change the current RF head for another RF head. The change can be based, for example, on a correlation result. If the subscriber terminal 201 is connected with several RF heads, then the

subscriber terminal 201 preferably establishes a connection with the RF head from which the base station 100 has received the signal with the greatest power.

In the radio system illustrated by Fig. 3, the RF heads 166, 167 receive an interference signal substantially simultaneously with an information signal. Since both subscriber terminals 201, 202 use the same training sequence, it is difficult for the base station 100 to separate the information signals form the interference signals. In practice this means that the receiver of the base station 100 is not able to separate the interference signal from the impulse response of the information signal estimated by it, whereby the quality of the signal is impaired.

Let us assume that the transmission means 101 command the subscriber terminal to send the base station 100 a signal having a time slot and frequency that are already used by another subscriber terminal and that are stored in the storage means 103. The adjustment means 205 then adjust the transmission moment of the signal to be transmitted to the base station 100. The adjustment means 205 adjust the transmission moment preferably before an actual connection is established.

Fig. 5 illustrates, by way of example, a normal burst of the GSM system, the burst comprising so-called tail bits in two blocks 401, 407. There are six tail bits in all. The actual data is coded in two blocks 402, 406. Each block contains 57 data bits. The burst also comprises two 1-bit blocks 403, 405, which are used to detect signaling. The burst further comprises a previously known training sequence 404 in the middle of the burst. Further, the burst comprises a 8.25-bit guard period. In a normal burst the training sequence is 26 bits long. In the known solutions, such as in the GSM, the impulse response is estimated by cross-correlating the received signal samples with the known training sequence. From the 26-bit long training sequence, 16 bits are used to estimate each impulse response tap.

The adjustment means 205 use the tail bits 401 at the beginning of the burst to adjust the transmission moment of the signal. The guard period 408 at the end of the burst is also used to adjust the burst. The burst thus comprises exactly 11.25 bits that can be used in the adjustment where necessary. The adjustment means 205 thus delay or advance the transmission moment of the signal by substantially at most an 11-bit period. The adjustment of the signal to be transmitted allows the training sequences to

be received at different moments at the base station 100, whereby the signals transmitted at the same frequency and in the same time slot can be separated at the base station 100 by means of correlation. If the signal transmitted by the subscriber terminal interferes too much with a signal transmitted by another subscriber terminal, the transmission means 101 command the interfering subscriber terminal to change the signal transmission frequency.

In the radio system illustrated by the figure, the signals transmitted onto the radio path arrive at the receiver fairly rapidly, since the distance of the subscriber terminal from the RF head of the base station 100 is short. This means that the delay of the signal on the radio path is short. The short delay allows the estimated impulse response to be limited, for example, to a length of 3 or 4 bits. In practice the correlation means 102 limit the impulse responses to substantially 3 bits. If the adjustment means 205 adjust the timing of the subscriber terminal 201, 202, then the base station 100 can receive the signal, for example, at a delay of 4 bits, whereby the different impulse responses do not yet interleave. The adjustment means 205 thus adjust the transmission moments of the signals so that the base station 100 receives the signals transmitted by the subscriber terminal at different moments.

As stated above, the signals received by the base station 100 can be measured, for example, for energy. That signal received by the RF head 161-167 whose impulse response has the highest energy is defined on the basis of the measurement. The signals received by the RF heads 161-167 can also be compared such that the summed energies of the correlation taps of a desired signal are compared with the summed energies of the correlation taps of an interference signal. The following formula (1) is used to estimate the ratio of the summed energies:

$$(1) \qquad estim(\frac{C}{I}) = \frac{\sum_i |h_i|^2}{\sum_j |h_j|^2}$$

where

C is the strength of an information signal,

I is the strength of an interference signal,

h_i is the impulse response of a desired signal at an instant i,

h_j is the impulse response of the interference signal at an instant j.

Since the impulse responses of the desired signal and the interference signal are known, a so-called joint detection method can be used, and this further improves the performance of the receiver. The joint detection method, for example a JMLSE method, can be used, for example, to improve the bit error ratio of the signal.

Although the invention is described above with reference to the example illustrated in the attached drawings, it is to be understood that the invention is not limited thereto but can be varied in many ways within the scope of the inventive idea disclosed in the attached claims.

CLAIMS

1. A transmission method used in a radio system that comprises at least one base station (100) and a number of subscriber terminals (201-203), at least two of which transmit access bursts to one and the same base station, the access burst activating between a subscriber terminal and a base station a connection that is established by a signal that is of a certain frequency and is sent in time slots, **characterized** in that when the subscriber terminal is commanded to send the base station a signal that employs a time slot and frequency already used by another subscriber terminal, the subscriber terminal is sent a command to adjust the transmission moment of the signal so that the base station receives the transmitted signals at different moments.

2. A method as claimed in claim 1, **characterized** in that the transmission moment is adjusted before an actual connection is established.

3. A method as claimed in claim 1, **characterized** in that a command is sent to delay the transmission moment of the signal.

4. A method as claimed in claim 1, **characterized** in that a command is sent to advance the transmission moment of the signal.

5. A method as claimed in claim 1, **characterized** in that a command is sent to delay the transmission moment of the signal by substantially at most an 11-bit period.

6. A method as claimed in claim 1, **characterized** in that a command is sent to advance the transmission moment of the signal by substantially at most an 11-bit period.

7. A method as claimed in claim 1, **characterized** in that the transmission moment of the signal is adjusted by at most the tail bits at the beginning of the burst and the guard period at the end of the burst.

8. A method as claimed in claim 1, **characterized** in that impulse responses are formed from the signals received by the base station, the impulse responses being defined to have a length of a minimum of substantially 3 bits.

9. A method as claimed in claim 1, **characterized** in that at least two signals of the same frequency are separated from each other, the signals having been received by the base station from one and the same time slot.

10. A method as claimed in claim 9, **characterized** in that

the signals are separated by means of training sequences of signals received at different moments.

11. A method as claimed in claim 1, **characterized** in that the signals received by the base station are correlated and, on the basis of the correlation, the signal with the best quality and for example the highest energy is selected, and the signal is then used as a connection-establishing signal.

12. A method as claimed in claim 1, **characterized** in that the signals received by the base station are correlated by means of a training sequence, the signals formed on the basis of the correlation are placed in windows, and the summed energies of the impulse responses of the signals placed in the windows are compared.

13. A method as claimed in claim 1, **characterized** in that the subscriber terminal is commanded to change the signal transmission frequency, if the signal transmitted by the subscriber terminal interferes with a signal transmitted by another subscriber terminal.

14. A method as claimed in claim 1, **characterized** in that the frequencies used in different signals are predetermined.

15. A method as claimed in claim 1, **characterized** in that the signals are transmitted by a time division multiple access TDMA method.

16. A method as claimed in claim 1, **characterized** in that the method is particularly suited for radio systems used, for example, in offices.

17. A radio system comprising at least one base station (100) and a number of subscriber terminals (201-203), at least two of which transmit access bursts to one and the same base station, the access burst activating between a subscriber terminal and a base station a connection that is established by a signal of a certain frequency sent in time slots, **characterized** in that the radio system comprises

transmission means (101), which command the subscriber terminal to send the base station (100) a signal that employs a time slot and frequency already used by another subscriber terminal, and

adjustment means (205), which on the basis of the command sent by the transmission means (101) adjust the transmission moment of the signal to be transmitted to the base station (101) so that the base station (101) receives the transmitted signals at different moments.

18. A radio system as claimed in claim 17, **characterized** in that the adjustment means (205) adjust the transmission moment before an actual connection is established.

19. A radio system as claimed in claim 17, **characterized** in that the transmission means (101) send a command that delays the transmission moment of the signal.

20. A radio system as claimed in claim 17, **characterized** in that the transmission means (101) send a command that advances the transmission moment of the signal.

21. A radio system as claimed in claim 17, **characterized** in that the transmission means (101) send a command that delays the transmission moment of the signal by substantially at most an 11-bit period.

22. A radio system as claimed in claim 17, **characterized** in that the transmission means (101) send a command that advances the transmission moment of the signal by substantially at most an 11-bit period.

23. A radio system as claimed in claim 17, **characterized** in that the adjustment means (205) adjust the transmission moment of the signal by at most the tail bits at the beginning of the burst and the guard period at the end of the burst.

24. A radio system as claimed in claim 17, **characterized** in that the adjustment means (205) are located in a subscriber terminal.

25. A radio system as claimed in claim 17, **characterized** in that the radio system comprises correlation means (102) for forming impulse responses from the signals received by the base station, the correlation means (102) defining the impulse responses so that they have a length of a minimum of substantially 3 bits.

26. A radio system as claimed in claim 17, **characterized** in that the radio system comprises correlation means (102) that, on the basis of the training sequences accompanying the signals transmitted by the subscriber terminal, separate from each other at least two signals that have the same frequency and have been received from the same time slot.

27. A radio system as claimed in claim 17, **characterized** in that the radio system comprises correlation means (102) that correlate the signals received by the base station and select, on the basis of the correlation, the signal with the best quality or for example the highest energy, and the signal is then used as an actual connection-establishing signal.

28. A radio system as claimed in claim 17, **characterized** in that the radio system comprises correlation means (102) that correlate the signals received by the base station by means of training sequences, and that place the signals formed on the basis of the correlation in windows, and that compare the summed energies of the impulse responses of the signals placed in the windows, whereby the interference signals and the subscriber terminal producing the interference signal can be detected.

29. A radio system as claimed in claim 17, **characterized** in that the radio system comprises correlation means (102) that correlate the signals received by the base station and detect, on the basis of the correlation, the signals interfering with the reception of the signal.

30. A radio system as claimed in claim 17, **characterized** in that the transmission means (101) command the subscriber terminal to change the signal transmission frequency, if the signal transmitted by the subscriber terminal interferes too much with a signal transmitted by another subscriber terminal.

31. A radio system as claimed in claim 17, **characterized** in that the radio system comprises storage means (103), which store information about the frequencies already used in different signals.

32. A radio system as claimed in claim 17, **characterized** in that a time division multiple access TDMA method is used in the radio system.

33. A radio system as claimed in claim 17, **characterized** in that the base station (100) of the radio system is a so-called office base station.

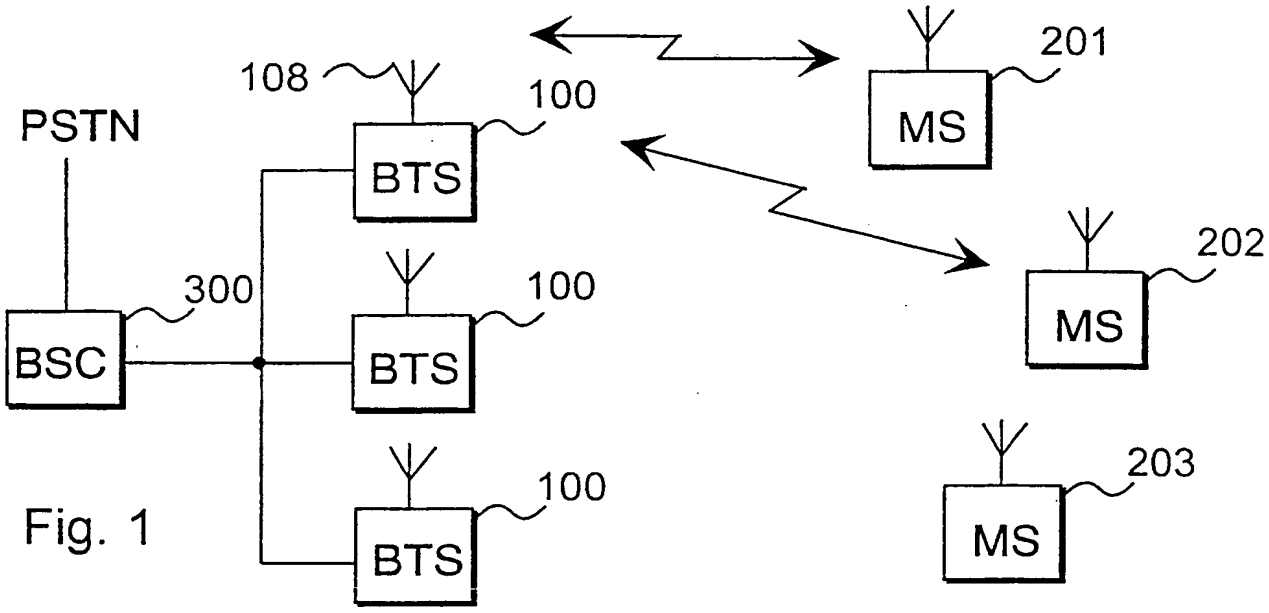
PSTN
BSC
300
108
BTS
100
BTS
100
BTS
100
MS
201
MS
202
MS
203

Fig. 1

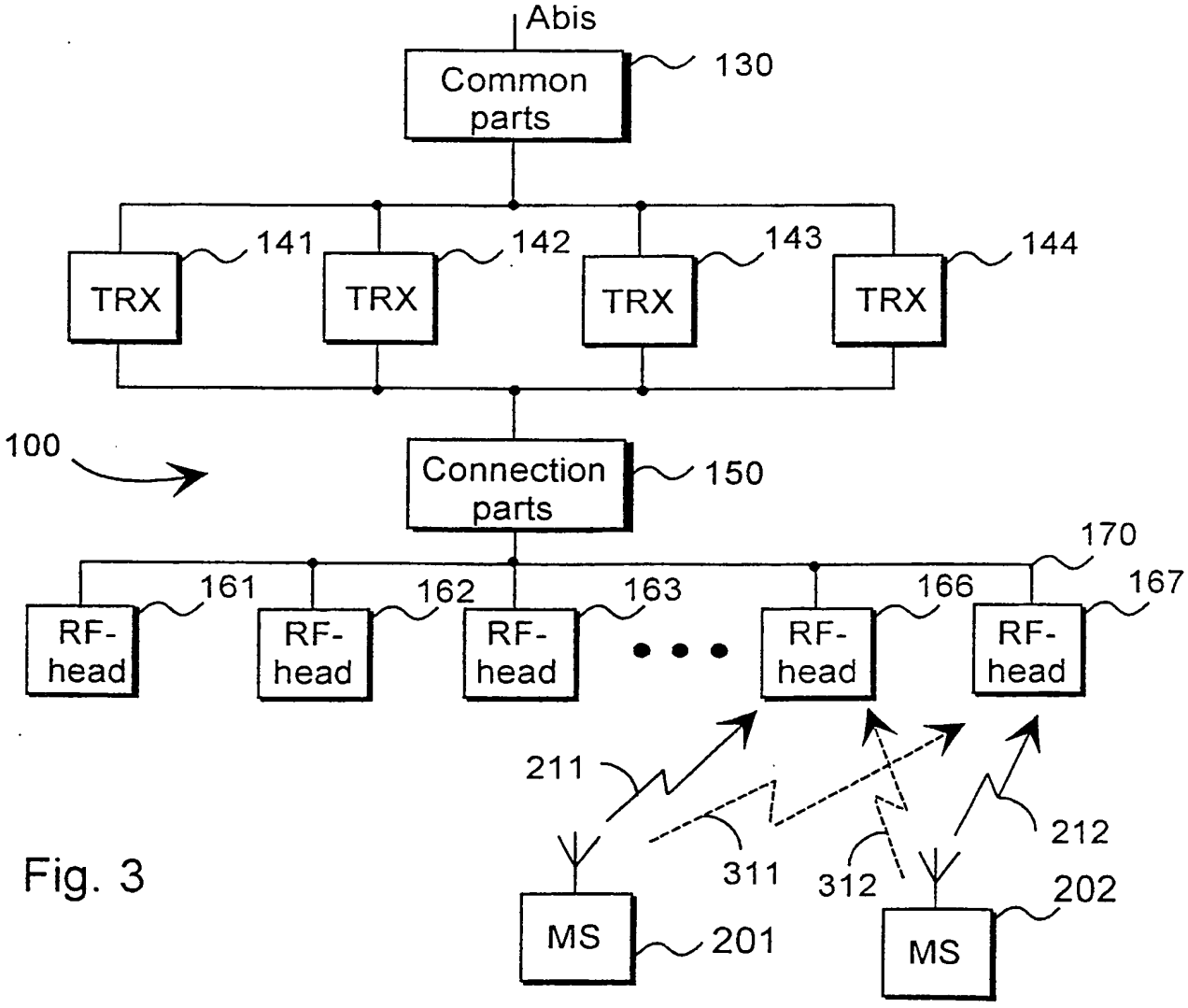
Abis
Common parts
130
TRX
141
TRX
142
TRX
143
TRX
144
100
Connection parts
150
170
RF-head
161
RF-head
162
RF-head
163
RF-head
166
RF-head
167
211
311
312
212
MS
201
MS
202

Fig. 3

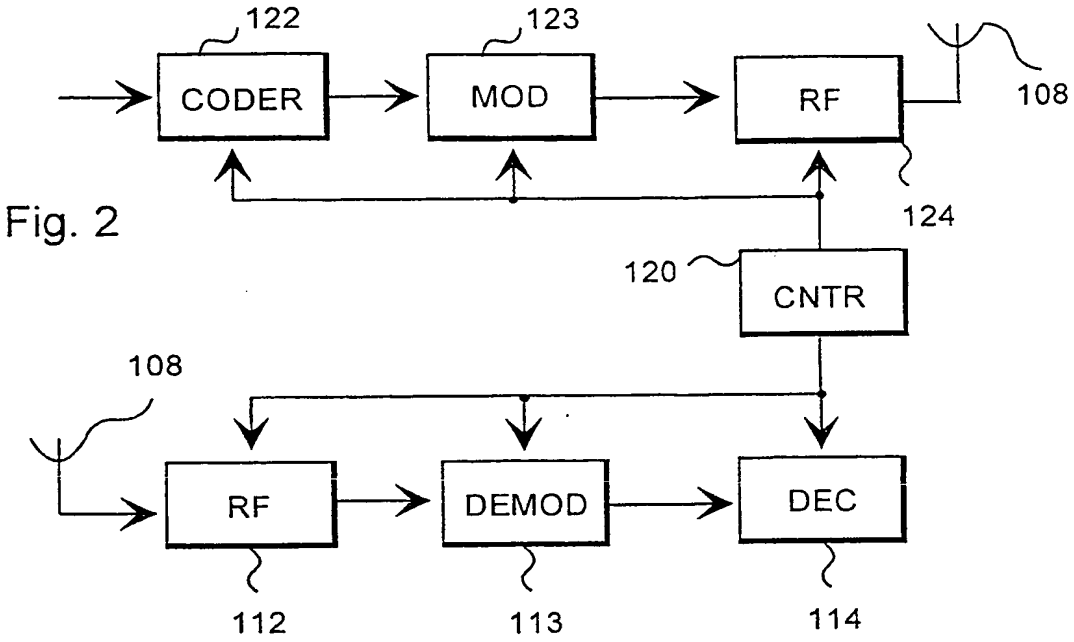

Fig. 2

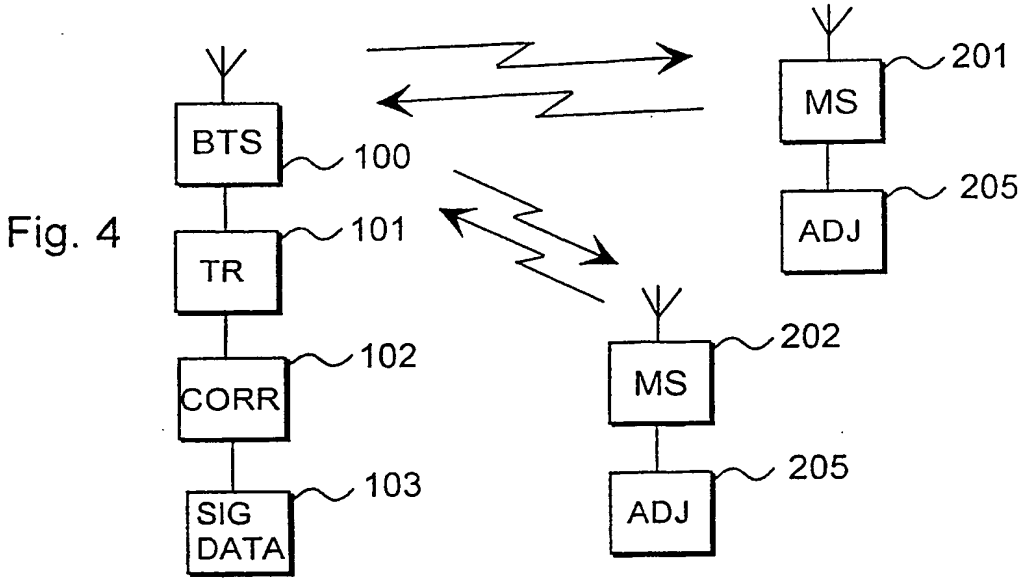

Fig. 4

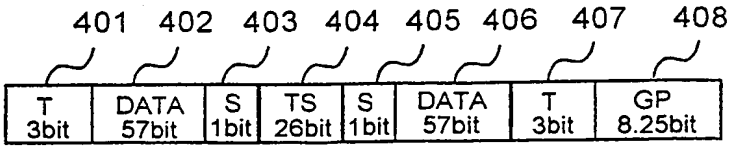

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 98/00946

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/38
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5517681 A (REINO TALARMO), 14 May 1996 (14.05.96), column 2, line 44 - column 3, line 7 --	1-33
A	WO 9721316 A3 (MOTOROLA LIMITED), 12 June 1997 (12.06.97), page 2, line 5 - line 34 --	1-3
A	WO 9639749 A1 (OMNIPOINT COPRORATION), 12 December 1996 (12.12.96), page 7, line 24 - page 9, line 23, abstract -- --------	1-33

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 May 1999	25 -05- 1999
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Stefan Hansson Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

03/05/99

International application No.
PCT/FI 98/00946

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5517681 A	14/05/96	AT 161380 T	15/01/98
		AU 664656 B	23/11/95
		AU 5113793 A	09/05/94
		DE 69315820 D,T	28/05/98
		EP 0617875 A,B	05/10/94
		SE 0617875 T3	
		FI 94994 B,C	15/08/95
		FI 924728 A	20/04/94
		WO 9409597 A	28/04/94
WO 9721316 A3	12/06/97	AU 7623696 A	27/06/97
		EP 0865710 A	23/09/98
		GB 2308041 A	11/06/97
		GB 9524908 D	00/00/00
WO 9639749 A1	12/12/96	AU 6025796 A	24/12/96
		CA 2223321 A	12/12/96
		CN 1192300 A	02/09/98
		EP 0873593 A	28/10/98
		IL 118447 D	00/00/00
		US 5802046 A	01/09/98
		US 5745484 A	28/04/98
		US 5689502 A	18/11/97

Translation

13

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

27 C1

(PCT Article 36 and Rule 70)

09/243195

Applicant's or agent's file reference 98004	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/UA98/00009	International filing date (*day/month/year*) 06 May 1998 (06.05.1998)	Priority date (*day/month/year*) 06 May 1997 (06.05.1997)
International Patent Classification (IPC) or national classification and IPC E02F 3/08		
Applicant OBSCHESTVO S OGRANICHENNOI OTVETSTVENNOSTIJU NAUCHNO-ISSLEDOVATELSKY I TEKHNICHESKY TSENTR "ROTOR"		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
24 November 1998 (24.11.1998)	28 June 1999 (28.06.1999)
Name and mailing address of the IPEA/RU Russian Patent Office, VNIIGPE, Berezhkovskaya nab.30/1 Moscow 121858, Russian Federation	Authorized officer
Facsimile No. (70-95) 243 33 37	Telephone No. (70-95) 240 58 22

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

national application No.
PCT/UA98/00009

I. Basis of the report

1. This report has been drawn on the basis of (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

☒ the international application as originally filed.

☐ the description, pages _____, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____.

☐ the claims, Nos. _____, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____.

☐ the drawings, sheets/fig _____, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

INTERNATIONAL PRE[redacted]NARY EXAMINATION REPORT

International application No.
[redacted]/UA 98/00009

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-9	YES
	Claims		NO
Inventive step (IS)	Claims	1-9	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-9	YES
	Claims		NO

2. Citations and explanations

Claims 1 to 9 of the invention satisfy the requirements of novelty, inventive step and industrial applicability, since the documents cited in the search report do not, either individually or in combination, disclose a machine for digging into the separate layers of the ground, in which the geometrical axis of a second hinged connection in the nominal working position of the machine is placed parallel to the longitudinal axis of the drive section of a base frame.

3T

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

27 II

(PCT Article 36 and Rule 70)

09/355630

Applicant's or agent's file reference PCT-0027	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP98/00659	International filing date (*day/month/year*) 17 February 1998 (17.02.1998)	Priority date (*day/month/year*) 19 February 1997 (19.02.1997)
International Patent Classification (IPC) or national classification and IPC H04N 5/63, H04N 5/60, H04N 5/44		
Applicant SANYO ELECTRIC CO., LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
07 September 1998 (07.09.1998)	26 March 1999 (26.03.1999)
Name and mailing address of the IPEA/JP Japanese Patent Office, 4-3 Kasumigaseki 3-chome Chiyoda-ku, Tokyo 100-8915, Japan Facsimile No.	Authorized officer Telephone No. (81-3) 3581 1101

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

[redacted]tional application No.
PCT/JP98/00659

I. Basis of the report

1. With regard to the **elements** of the international application:*

☒ the international application as originally filed

☐ the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the claims:

pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the drawings:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP98/00659

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-23	YES
	Claims		NO
Inventive step (IS)	Claims	5-7,9-23	YES
	Claims	1-4,8	NO
Industrial applicability (IA)	Claims	1-23	YES
	Claims		NO

2. Citations and explanations

Claims 1-4

The subject matter of claims 1-4 does not appear to involve an inventive step in view of undermentioned documents 1 and 2 (the latter of which is cited in the ISR).

Document 1 [paragraph [0012]] contains the disclosure 'when the audio mode control code indicates the audio mode whereby there is no TV audio and only additional independent audio is played, a disconnect signal is provided from the aforementioned judgement circuit to the disconnection circuit, and power supply to the aforementioned picture processing circuit and the picture display unit is shut off.'

Document 2 [paragraph [0009]] contains the disclosure '... with the special feature of being equipped with a broadcast mode detection means that detects the broadcast mode and outputs the detection result, and a horizontal power supply control means that carries out control in such a way that no power is supplied to the TV horizontal deflection circuit in the case that – according to the detection result of the broadcast mode detection means – the broadcast mode is such that a CRT image is not needed...'.

Claim 8

The subject matter of claim 8 does not appear to involve an inventive step in view of undermentioned documents 3 and 4 (both of which are cited in the ISR).

Document 3 [paragraph [0006]] contains the disclosure 'the power supply to tuners that are not needed can be turned off automatically in accordance with the operation mode of the TV receiver with built-in VTR.'

Document 4 discloses the idea of supplying power only to those parts that are relevant in the current operation mode.

Notes

Document 1: JP, 4-286295, A (Toshiba Corporation), 12 October, 1992
Document 2: JP, 6-268936, A (Sharp Corporation), 22 September, 1994
Document 3: JP, 8-298636, A (Mitsubishi Electric Corporation), 12 November, 1996
Document 4: JP, 4-20778, U (Fujitsu General Limited), 21 February, 1992

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Concerning claims 14, 19

At the end, there is a disclosure concerning providing 'a control means for controlling the power supplied from the aforementioned power supply means to the aforementioned display means in the case that a digital broadcast is received on account of a reservation by means of the aforementioned reservation reception means.' However, it is not clear what kind of control is carried out, and so the invention in question is unclear.

6T

Translation

09/341647

27C1

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 997354	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP98/00061	International filing date (*day/month/year*) 09 January 1998 (09.01.1998)	Priority date (*day/month/year*) 30 January 1997 (30.01.1997)
International Patent Classification (IPC) or national classification and IPC G06K 19/073, G06K 17/00, G06F 12/14		
Applicant ROHM CO., LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
20 May 1998 (20.05.1998)	27 January 1999 (27.01.1999)
Name and mailing address of the IPEA/JP Japanese Patent Office, 4-3 Kasumigaseki 3-chome Chiyoda-ku, Tokyo 100-8915, Japan Facsimile No.	Authorized officer Telephone No. (81-3) 3581 1101

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

ational application No.
PCT/JP98/00061

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1,3-19, as originally filed
pages _____, filed with the demand
pages 2, filed with the letter of 05 October 1998 (05.10.1998)

☒ the claims:

pages 2-16, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 1, filed with the letter of 05 October 1998 (05.10.1998)

☒ the drawings:

pages 1-17, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP 98/00061

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-16	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-16	NO
Industrial applicability (IA)	Claims	1-16	YES
	Claims		NO

2. Citations and explanations

Claim 1:

In the light of the following documents, Claim 1 lacks an inventive step.

Document 1: JP, 3-208192, A (Hitachi Maxell, Ltd.), September 11, 1991 (11. 09. 91), Document 2: JP, 2-120951, A (Toshiba Corp.), May 8, 1990 (08. 05. 90), Document 3: JP, 7-73110, A (Tokimec Inc.), March 17, 1995 (17. 03. 95), Document 4: JP, 5-173888, A (Tokyo Electric Co., Ltd.), July 13, 1993 (13. 07. 93), Document 5: JP, 2-5160, A (SJS-Thomson Microelectronics S.A.), January 10, 1990 (10. 01. 90) & US, 5014312, A.

Document 1, page 2, lower left column, line 20 to lower right column, line 4, describes a fixed item storage area (3), which provides write protection against external sources for an IC card in an issued state. It is easy for a person skilled in the art to apply thereto the write protection means described in Documents 2 to 4, which uses a configuration permitting data to be written only once. Further, Document 1, page 2, lower left column, line 15, describes the reception of information using a reader-writer, etc. It is easy for a person skilled in the art to apply the method of use of this reader-writer to the device described in, for example, Document 5, page 4,

upper left column, lines 15 to 19, wherein the device has differing functions, having a data communication means retained by the manufacturer (the initializer), and a specific data writing device retained by the writer of the specific data (the user). Moreover, giving the erase (initialize) directive by means of commands does not present any specific difficulty.

Claim 2 and Claim 3 lack an inventive step in the light of Documents 1 to 5.
A cipher key for read/write protecting data is a matter of common knowledge and is described, for example, in Document 3. It would be easy for a person skilled in the art to apply the cipher key for read/write protecting data to the fixed item storage area 3 of the IC card described in Document 1.

Claim 4 and Claim 5 lack an inventive step in the light of Documents 1 to 5.
When data is erased from the IC card described in Document 1, a password number (a cipher key) is also erased (initialized). Furthermore, Document 3, second column, lines 20-22, describes the feature of preventing a password code (cipher key), which has been stored once, from being changed. It is easy for a person skilled in the art to permit the cipher key to be written only once and to prevent it from being changed in the case where protection using a cipher key is performed.

Claim 6 lacks an inventive step in the light of Documents 1 to 5.
Document 5 describes a configuration which permits data to be written only once using a write flag.

Claim 7 to Claim 9 lack an inventive step in the light of

Documents 1 to 5.
The IC card described in Document 1 is provided with a variable item storage area 4 which permits data from external sources to be written, and in which the number of times data can be read and re-written is practically unlimited. Moroever, as mentioned above, a cipher key for read/write protecting data is a matter of common knowledge. It would be easy for a person skilled in the art to apply the cipher key for read/write protecting data to the variable item storage area 4.

Claim 10 lacks an inventive step in the light of Documents 1 to 4 and Document 6: JP, 56-38650, A (Compagnie Internationale pour l'Informatique CII-Honeywell Bull), April 13, 1981 (13. 04. 81).
Document 6 describes the prevention of an abnormal erasure operation by allowing
the erasure of memory included in a recording carrier to occur only under certain conditions. Encrypting a command to prevent abnormal erasure is a common technique, and it would be easy for a person skilled in the art to give the erase (initialize) directive by means of encrypted commands to the IC card described in Document 1.

Claim 11 and Claim 13 lack an inventive step in the light of Documents 1 to 5.
The communication method of the IC card, whereby data is communicated, via an electromagnetic wave, through electrical means either involving no contact or involving contact, are both common techniques. Whether the data should be communicated via an electromagnetic wave through electrical non-contact or electrical contact in the case of the IC card of the cited Example 1, is a choice that a person skilled in the art can easily make, as needed.

Claim 12 lacks an inventive step in the light of Documents 1 to 6 and Document 7: JP, 60-183692, A (Mitsubishi Electric Corp.), September 19, 1985 (19. 09. 85).
Document 7 describes technology wherein frequency data are used as fixed information, and a specific operation is possible only in the case where a prescribed frequency is obtained. It would be easy for a person skilled in the art to apply this operation, whereby memory is erased (initialized) only when a prescribed frequency is obtained, to the IC card described in Document 1, and thereby reject an abnormal erasure operation.

Claims 14 to 16 lack an inventive step in the light of Documents 1 to 6.
Claims 14 and 16 describe an invention related to Claims 1 and 2, whereby the method of its use differs. In fact, the technical thought underlying Claims 14 and 16 is identical with that of Claim 1 and Claim 2. Consequently they are easy for a person skilled in the art to apply for the same reasons as in Claim 1 and Claim 2.
Further, Claim 15 restricts the "initializer" and the "writer of the specfic data" described in Claim 14 to "the manufacturer of the IC card" and "the user of the IC card" respectively. This restriction does not pose any particular difficulty.

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

In the fourteenth and fifteenth characters of line 11, page 16 of the Specification, the word "easy" is wrongly used in place of "preparation".

4T

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

27I1

(PCT Article 36 and Rule 70)

09/424454

Applicant's or agent's file reference 4244	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP98/02383	International filing date (*day/month/year*) 29 May 1998 (29.05.1998)	Priority date (*day/month/year*) 02 June 1997 (02.06.1997)
International Patent Classification (IPC) or national classification and IPC G06F 11/22		
Applicant KOKEN CO., LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
04 September 1998 (04.09.1998)	17 May 1999 (17.05.1999)
Name and mailing address of the IPEA/JP Japanese Patent Office, 4-3 Kasumigaseki 3-chome Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer
Facsimile No.	Telephone No. (81-3) 3581 1101

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP98/02383

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-5, 9, 10, 12-18, as originally filed

pages _____, filed with the demand

pages 6-8, 11, filed with the letter of 07 December 1998 (07.12.1998)

☒ the claims:

pages _____, as originally filed

pages _____, as amended (together with any statement under Article 19

pages _____, filed with the demand

pages 2-4, filed with the letter of 07 December 1998 (07.12.1998)

☒ the drawings:

pages 1-9, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☒ the claims, Nos. 1

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2-4	**YES**
	Claims		**NO**
Inventive step (IS)	Claims	2-4	**YES**
	Claims		**NO**
Industrial applicability (IA)	Claims	2-4	**YES**
	Claims		**NO**

2. Citations and explanations

A boundary scan element provided with two input terminals and two output terminals for inputting and outputting the serial data sent to the boundary cell and a communication device wherein the aforementioned boundary cells are connected in series and communication data for controlling a plurality of terminals individually is transmitted and received via the aforementioned boundary element are not disclosed in any of the documents cited in the international search report. Moreover, they are not obvious to a person skilled in the art.

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

2711

(PCT Article 36 and Rule 70)

09/423206

Applicant's or agent's file reference AKK-14-PCT	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP98/02410	International filing date (*day/month/year*) 01 June 1998 (01.06.1998)	Priority date (*day/month/year*) 02 June 1997 (02.06.1997)
International Patent Classification (IPC) or national classification and IPC H03B 5/32		
Applicant ASAHI KASEI MICROSYSTEMS CO., LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
01 June 1998 (01.06.1998)	18 November 1998 (18.11.1998)
Name and mailing address of the IPEA/JP Japanese Patent Office, 4-3 Kasumigaseki 3-chome Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer
Facsimile No.	Telephone No. (81-3) 3581 1101

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP98/02410

I. Basis of the report

1. This report has been drawn on the basis of (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

☐ the international application as originally filed.

☒ the description, pages 1, 3-9, 12-23, as originally filed,
pages _____, filed with the demand,
pages 2, 10, 11, filed with the letter of 26 August 1998 (26.08.1998),
pages _____, filed with the letter of _____.

☒ the claims, Nos. 1-6, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____.

☒ the drawings, sheets/fig 1-15, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

INTERNATIONAL PRELIM[redacted]RY EXAMINATION REPORT

International application No.
PC[redacted]P 98/02410

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-6	YES
	Claims		NO
Inventive step (IS)	Claims	1-5	YES
	Claims	6	NO
Industrial applicability (IA)	Claims	1-6	YES
	Claims		NO

2. Citations and explanations

Claim 6 does not involve an inventive step in light of Document 1 (JP, 8-116214, A (Fujitsu, Ltd.), May 7, 1996 (07.05.96)) cited in the international search report.

Document 1 (see, in particular, Fig. 4) discloses a method for carrying out temperature compensation of a voltage-controlled quartz oscillator, using a temperature compensation circuit that is capable of α adjustment ("offset adjustment" in Fig. 4), factor β of $x-\alpha$ adjustment ("gain adjustment 26" in Fig. 4), factor A of $(x-\alpha)^3$ adjustment ("gain adjustment 27A" in Fig. 4) and constant term γ adjustment ("constant generating section 28" in Fig. 4). It is clear that by following the notations in Claim 6, the parameters A, α , β and γ of Document 1 become β_3, T_0, β_1 and β_0.

Moreover, since the method disclosed in Document 1 is for compensating the temperature properties of a quartz oscillator, it is clear that the above-mentioned parameters need to be set so that they are harmonised with the temperature properties of the quartz oscillator. The temperature properties of the quartz oscillator should be obtained by observation at a plurality of temperatures.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

In Claim 1, it is unclear to which part of the third-order function component that is ultimately output the output of the first through fourth amplifiers contribute.

14T

Translation

09/380274

2712

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 660696	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP98/00755	International filing date (*day/month/year*) 25 February 1998 (25.02.1998)	Priority date (*day/month/year*) 27 February 1997 (27.02.1997)
International Patent Classification (IPC) or national classification and IPC A61K 31/13, A61K 47/24, A61K 47/26, A61K 31/00		
Applicant YOSHITOMI PHARMACEUTICAL INDUSTRIES, LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
23 June 1998 (23.06.1998)	22 February 1999 (22.02.1999)
Name and mailing address of the IPEA/JP Japanese Patent Office, 4-3 Kasumigaseki 3-chome Chiyoda-ku, Tokyo 100-8915, Japan Facsimile No.	Authorized officer Telephone No. (81-3) 3581 1101

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

national application No.
PCT/JP98/00755

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-15, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:

pages 1-12, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 13, filed with the letter of 26 October 1998 (26.10.1998)

☐ the drawings:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

national application No.
PCT/JP98/00755

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-13	YES
	Claims		NO
Inventive step (IS)	Claims	1-13	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-13	YES
	Claims		NO

2. Citations and explanations

Documents cited in the ISR:
Document 1: WO, 96/06068, A1 (Yoshitomi Pharmaceutical Industries, Ltd.), 29 February, 1996 (29.02.96)
Document 2: WO, 94/08943, A1 (Yoshitomi Pharmaceutical Industries, Ltd.), 28 April, 1994 (28.04.94)
Document 3: JP, 4-173736, A (Nippon Shinyaku Co., Ltd.), 22 June, 1992 (22.06.92)
Document 4: JP, 61-172814, A (SS Pharmaceutical Co., Ltd.), 4 August, 1986 (04.08.86)

Additional documents newly cited on this occasion:
Document 5: JP, 63-152327, A (Toyama Chemical Co., Ltd.), 24 June, 1988 (24.06.88)
Document 6: JP, 3-169807, A (Abbott Laboratories), 23 July, 1991 (23.07.91)

Documents 1 and 2 disclose medicinal compositions that have as their active ingredient 2-amino-2-[2-(4-octylphenyl)ethyl]propane-1,3-diol or a pharmacologically acceptable acid addition salt thereof.

Document 3 discloses pharmaceutical art in which a phospholipid such as a lecithin is added with the aim of reducing side effects such as hemolysis by an active compound.

Document 4 discloses the fact that pharmaceutical preparations that use a lecithin as a stabilizer tend not to be very hemolytic.

Document 5 discloses pharmaceutical art in which a phospholipid such as a lecithin is added with the aim of reducing the hemolytic effects of an active ingredient without affecting the physiologically useful effects of that active ingredient.

Document 6 discloses pharmaceutical art in which a phospholipid such as a lecithin is added with the aim of reducing side effects such as hemolysis by an active compound.

With the invention of the present application, it has been discovered that, by mixing with a lecithin, a liquid preparation such as an injection or eye drops can be made whereby not only are side effects such as hemolysis caused by the active ingredient – 2-amino-2-[2-(4-octylphenyl)ethyl]propane-1,3-diol or a pharmacologically acceptable acid addition salt thereof – inhibited, but also 'local irritation' is inhibited. The fact that a medicinal composition that has such an additional effect can be obtained is not disclosed in or suggested by any of above-mentioned documents 1-6.

Accordingly, neither the novelty nor the involvement of an inventive step of the inventions disclosed in claims 1-13 of the present application is disputed.

The inventions disclosed in claims 1-13 are considered to have industrial applicability.

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

Application No. Patent No.	Publication date *(day/month/year)*	Filing date *(day/month/year)*	Priority date (valid claim) *(day/month/year)*
EP, 812588, A1 (PX)	17 December 1997 (17.12.1997)	24 December 1996 (24.12.1996)	28 December 1995 (28.12.1995)

2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure	Date of non-written disclosure *(day/month/year)*	Date of written disclosure referring to non-written disclosure *(day/month/year)*